DOCUMENT RESUME

ED 144 325 EC 102 373

TITLE	Little Babies: Born Too Soon--Born Too Small.
INSTITUTION	National Inst. of Child Health and Human Development (NIH), Bethesda, Md. Office of Research Reporting.
REPORT NO	DHEW-NIH-77-1079
PUB DATE	77
NOTE	15p.
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	*Body Weight; Individual Characteristics; *Infancy; Mothers; *Premature Infants; Prenatal Influences; Prevention; Research Reviews (Publications); *Special Health Problems
IDENTIFIERS	*Parent Resources

ABSTRACT

The booklet describes the condttion known as low birth weight and suggests ways in which a mother can take precautions against its occurring in her own child. Problems and maternal factors associated with low birth weight babies are discussed, and research on the causes of prematurity and growth retardation are reviewed. (SBH)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED144325

LITTLE BABIES
BORN TOO SOON
BORN TOO SMALL

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Prepared by:
Office of Research Reporting
National Institute of Child Health
and Human Development
National Institutes of Health
Bethesda, Maryland 20014
1977

EC 102373

DHEW Publication No. (NIH) 77-1079

One in every 13 babies born yearly in the United States is born too early, too small, or both. Low birth weight infants account for 70 percent of all neonatal deaths. Half occur during the first 24 hours of life. At birth the infant must take over vital life functions such as breathing, metabolism, excretion, and control of body temperature. Babies too small or too immature are unable to handle these functions quickly or efficiently.

This pamphlet describes special problems low birth weight infants have in adjusting to the extrauterine environment, what can be done to prevent low birth weight, some measures physicians take to save these high-risk infants, and NICHD research on the causes of low birth weight.

A baby weighing less than 5½ pounds (2,500 grams) at birth is defined as a low birth weight infant. These may be premature infants born before 37 weeks of gestation, or full-term infants, small for gestational age, born after a pregnancy of 37 to 42 weeks. Premature infants may not have had sufficient time in the uterus to grow and develop fully; full-term low birth weight infants have not

grown rapidly enough before birth. Some infants are both premature and growth-retarded.

Until recently, all low birth weight infants were regarded as premature and their difficulties were assessed and treated alike. Now, however, intrauterine growth retardation is recognized as being responsible for one-third of all low birth weight babies. Accurate diagnosis is critical, since care for the true pre-term infant is not necessarily appropriate for the full-term growth-retarded baby.

Infant Death and Disability

Total births in the U.S. (1974)	3,159,958
Total low birth weight infants (1974)	233,750
Low birth weight infants who die in first month of life (1960 cohort study)	56,865
Low birth weight infants at risk for lifetime disability	ca. 60,000

The United States ranks fourteenth among developed nations in infant mortality rate.

Problems of the Low Birth Weight Newborn

Low birth weight infants are more susceptible to neonatal complications than are babies of normal weight. Growth-retarded infants are subject to

metabolic, nutritional, and neurological disorders. Premature infants may suffer from respiratory, thermal, or neurological problems.

In *respiratory distress syndrome* (RDS), the baby's immature lungs prevent its getting enough oxygen to supply body tissues. The lack of gas exchange in the unexpanded, immature lung sacs also causes life-threatening changes in body chemistry. Infants born with RDS are monitored for changes in blood gases and helped to breathe with oxygen and with special types of respirators. This assisted ventilation procedure has increased survival chances of infants suffering RDS. Physicians are also using new techniques to recognize early signs of RDS during delivery so that infants in distress can be helped earlier.

Low birth weight infants, particularly full-term growth-retarded infants or those with diabetic mothers, may have low blood sugar or *hypoglycemia*. This condition develops a few hours after birth if the baby is unable to store glucose in the liver in a retrievable form. Hypoglycemic babies may show signs of tremors, irritability, eye rolling, listlessness, or lack of interest in eating and must be fed glucose intravenously to maintain normal blood concentration of this nutrient.

Some newborns, including low birth weight infants, become jaundiced (yellowish tinge to the skin) from an excess of bilirubin in their blood. Bilirubin is the normal breakdown product of hemoglobin, the blood component that carries oxygen from the lungs to the

body tissues. During pregnancy, the mother's liver changes bilirubin into a harmless, excretable form for the baby. As the baby's liver is slow in taking over the job after birth, bilirubin levels build up in the blood and may cause brain damage (kernicterus). This increase in bilirubin in the circulation is called *hyperbilirubinemia* and can be treated in most cases by special lighting (phototherapy) to break down excess bilirubin. In some cases, an exchange of the infant's blood may be necessary.

Normally, the unborn child accumulates a supply of iron in the later months of pregnancy. This reserve in the fetal liver is drawn upon during early infancy for the manufacture of hemoglobin. If, as may happen in premature infants, the iron store is insufficient, *anemia* results if iron is not supplied. Infants with severe anemia may require transfusions; less serious cases can be treated with dietary iron supplements.

Subcutaneous fat acts both as insulation and as an energy source for the newborn. Premature infants do not have that layer of protecting fat to retain body heat outside the mother's womb. Consequently, the baby is less tolerant of cold and may develop *hypothermia*, or a decrease in body temperature. Hypothermia is frequent but can be prevented. If left untreated, hypothermia can cause a serious alteration in the blood chemistry. To assist the baby in coping with his new environment outside the womb, it is usually kept in an environmentally temperature controlled incubator in the hospital nursery.

Physicians are able to treat a number of illnesses of these small infants, so the prognosis for a majority of the babies is good. Therapeutic approaches are varied; some help accelerate an infant's growth and maturation, some prevent the development of ailments, and others treat specific disorders. Seriously ill babies are treated in neonatal intensive care nurseries. There, using highly sophisticated diagnostic and therapeutic techniques, specially prepared physicians and nurses care for these tiny infants. This care and treatment assures survival for most and lessens the likelihood of disability.

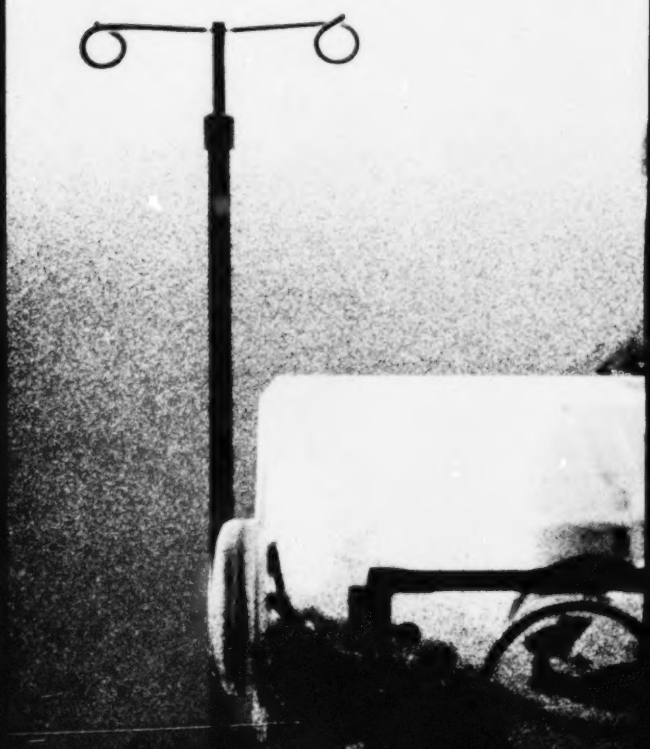
Maternal Factors

Although premature or growth-retarded infants have been born to well-nourished, apparently healthy mothers of all income levels, epidemiologic studies reveal several maternal characteristics frequently associated with low birth weight.

Low birth weight infants are more often born to mothers who:

- are younger than 16
- have previously given birth to a low birth weight infant
- are suffering from a chronic condition
- are undernourished
- smoke cigarettes
- are alcoholics or addicted to narcotics
- have not had regular prenatal care
- have certain genetic disorders

Teenage mothers: Maternal age is an important factor in infant survival rates. Mothers under 16 bear the greatest risk of giving birth to premature infants, and one of every four low birth weight babies is born to a teenage mother. Teenage pregnancy is more frequent in urban environments where other psychosocial factors may adversely affect the course of pregnancy. The mortality rate for babies born to this age group is correspondingly high. Why so many of these young mothers bear premature or low birth weight infants is not completely clear. Even after menstruation has



started a girl's reproductive organs may not be sufficiently mature to carry a baby without undue stress. A teenage mother is also less likely to have a balanced diet and regular prenatal care.

Chronic conditions: Women suffering from chronic conditions such as toxemia, hypertension, diabetes mellitus, congenital heart conditions, kidney disorders, or respiratory ailments are more likely to have low birth weight infants. Approximately 20 percent of all women in the U.S. who become pregnant have one or more health problems serious

enough to complicate pregnancy and place the unborn child in jeopardy.

Socioeconomic factors: The birth of some smaller than normal infants appears to be related to the poor nutritional status of the mother. Primate studies have shown that when pregnant animals were deprived of protein essential for maternal diet, there was a marked increase in fetal mortality and reduced birth weight in their infants of normal gestational age.

Cigarettes, alcohol, and drugs: The effects of cigarette smoking on the growth of an unborn child have been well documented in the past 15 years. Mothers who are heavy smokers and inhale when smoking give birth to babies whose average weight is significantly less than that of infants born to nonsmoking mothers. One of the contributing factors may be that higher concentrations of carbon monoxide in the blood of a smoking mother deprive her developing child of oxygen necessary for optimal growth. Although less information is available about mothers who are addicted to drugs or alcohol, some investigators have found that infants of heroin- and methadone-addicted women are underweight. These drugs are believed to inhibit fetal growth by blocking a biochemical reaction necessary for oxygen transfer in the placenta. Infants born to alcoholic mothers also tend to be small for gestational age and some demonstrate a fetal-alcohol syndrome involving physical abnormalities and mental

retardation. Nutritional factors also play an important role in the pregnancies of drug-addicted or alcoholic women.

Research

The National Institute of Child Health and Human Development is concerned with the multiple causes underlying prematurity and growth retardation in infants. Studies involve investigations on high-risk pregnancies, embryonic growth, fetal development, and premature labor. Other studies are concerned with the processes and problems of adaptation to life outside the uterus and the management and treatment of specific diseases and disorders to which these small infants fall victim.

Pregnancy research: A major emphasis of NICHD's research is toward understanding the biological and environmental conditions that place a pregnant woman and her baby at risk. One significant area of investigation concerns early identification of high risk conditions and complications of pregnancy. The Institute is supporting a followup study of women with various chronic conditions to determine the effect of pregnancy on the course of the disease, the development of complications, and the effects on the fetus. Other Institute projects involve research on the effects of exercise during pregnancy in normal and disease states, placental and hormonal dynamics, and alterations of maternal physiology in anemia.

Teenage pregnancy: The birth rate has declined greatly among women over 20, but the rise in teenage pregnancies has been noteworthy. Apart from whatever problems an unplanned pregnancy imposes on an adolescent girl, births among teenagers contribute heavily to infant mortality. NICHD is assessing current knowledge and understanding of behavioral and biomedical aspects of teenage fertility, including studies on the determinants and consequences of adolescent pregnancy and childbearing.

Fetal development: Study of the developing fetus centers around the complex dynamic interaction with the mother through the placenta, metabolic states required for normal fetal growth and various diseases that contribute to abnormal or retarded development of the fetus.

Labor and the birth process: The birth process itself is associated with the loss of 10,000 full-term apparently normal babies each year. A significant number of infants are damaged during labor and delivery to the point of rendering them incapable of independent and productive lives. In addition, an unknown number are minimally brain-damaged, thus unable to realize their full intellectual potential. NICHD's research on the birth process focuses on uterine muscle contractibility, uterine blood flow during labor, endocrine control of pregnancy and birth, effects of drugs on labor and on the fetus (both short term and long term), and on developing monitoring

systems for detecting fetal distress during the process of labor.

Newborns at high risk: The functional maturity of the newborn's respiratory system is essential for survival. Premature infants, in particular, may be afflicted with respiratory distress syndrome (RDS). In this condition the immature lung cannot expand after the infant breathes out. Primarily, this condition is the result of a deficiency of a fatty material important in the production of lung surfactant, which is responsible for reducing surface tension in the lung when it inflates. The nature of pulmonary surfactant is undergoing intensive study by NICHD. In addition, researchers are involved in studying the maturation of the fetal lung and in developing improved methods of treating respiratory distress syndrome. NICHD scientists are also studying the causes of neonatal jaundice. Studies are being conducted on the metabolic and molecular aspects of bilirubin production and disposition. Of particular interest are the largely unknown mechanisms of toxicity to the brain. Current and new therapeutic approaches to hyperbilirubinemia and their possible long-term effect are also under study. Since the metabolism of the fetus and the newborn is considerably different from that of an adult, scientists are particularly concerned with fetal growth *in utero*, the causes of fetal growth retardation, and the metabolic demand on the newborn during the critical period of adaptation after birth.

Center for Research for Mothers and Children

The National Institute of Child Health and Human Development continues to seek new knowledge on the causes of low birth weight in infants and to facilitate the application of that knowledge to benefit mothers and children. Toward this end, the NICHD will establish, through its Center for Research for Mothers and Children, a national network of research centers devoted to the study of diseases and disorders of pregnancy, infancy, and early childhood. Each center will bring scientists and clinicians together in a situation that fosters maximum exchange of information. For example, a major research program devoted to the problem of prematurity will enable biomedical scientists, and obstetricians studying the birth process, to work side-by-side with pediatricians studying the premature infant. Results obtained through this research program approach may be translated more readily into improved care for high-risk patients. Thus, each major program would serve as both a nucleus for research and a stimulus for higher-quality medical care. In this way, NICHD aims to insure the best possible start in life for every baby born in the United States and to reduce the incidence of infant death and disability.

The National Institute of Child Health and Human Development is the focal agency for research on the health of mothers and children, family planning, and the study of population. Within the Institute, the Center for Research for Mothers and Children is responsible for support of research activities in the biomedical, social, and behavioral sciences on maternal and child health and the processes of human development. The Center supports grant, contract, and research training programs in pregnancy, perinatal biology, developmental biology, infancy, developmental disabilities and mental retardation.